

LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Please amend claims 33, 38, 46, 48, and 62 as follows.

1-32. (Canceled)

33. (Currently amended) A work machine management system for work machines that perform prescribed work by operation of a plurality of work machines, comprising:
a plurality of work machines, said plurality of work machines respectively including a first communication means facilitating reciprocal communications directly between said plurality of work machines;

a server apparatus; wherein at least one leader machine of said plurality of work machines and said server apparatus including second communication means facilitating reciprocal communications between said server apparatus and said at least one leader work machine of said plurality of work machines;

each of said plurality of work machines being provided with work machine information detection means for detecting work machine information;

a database storing data for managing said plurality of work machines, and management information production means automatically producing management information based on said work machine information and on said data stored in said database, provided at said server apparatus;

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in conjunction with work progress of said plurality of work machines, said work machine information being detected by said work machine information detection means provided in said plurality of work machines, and the work machine information so detected being transmitted to said at least one leader work machine through said first communication means;

said at least one leader machine transmitting said transmitted work machine information to said server apparatus through said second communication means;

said server apparatus producing said management information based on said transmitted work machine information and on said data stored in said database, and transmitting the management information so produced only to said at least one leader work machine through said second communication means; and

only said at least one leader work machine transmitting work instructions to other work machines of said plurality of work machines through said first communication means, based on said transmitted management information.

34. (Previously presented) The work machine management system according to claim 33, wherein said at least one leader work machine includes a display device, and wherein said management information transmitted from said server apparatus to said at least one leader work machine is displayed on the display device.

35. (Previously presented) The work machine management system according to claim 33, wherein said prescribed work comprises a plurality of work processes; and said at least one leader work machine is determined for each of those work processes.

36. (Previously presented) The work machine management system according to claim 33, wherein said management information produced by said server apparatus and transmitted to said at least one leader work machine is information relating to maintenance that should be performed on any of said plurality of work machines.

37. (Previously presented) The work machine management system according to claim 33, wherein said management information produced by said server apparatus and transmitted to said at least one leader work machine is information relating to a trouble that has occurred in any of said plurality of work machines.

38. (Currently amended) A work machine management system for work machines that perform prescribed work by operation of a plurality of work machines in accordance with a scheduled work plan, comprising:

a plurality of work machines, said plurality of work machines respectively including a first communication means facilitating reciprocal communications directly between said plurality of work machines;

a server apparatus; wherein only at least one leader work machine only of said plurality of work machines and said server apparatus including a second communication means facilitating reciprocal communications between said server apparatus and said at least one leader work machine of said plurality of work machines;

each of said plurality of work machines being provided with work machine information detection means for detecting work machine information;

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a database storing data for managing said plurality of work machines, and scheduled work plan production means producing a scheduled work plan based on said work machine information and on said data stored in said database, provided at said server apparatus; in conjunction with work progress of said plurality of work machines, said work machine information being detected by said work machine information detection means provided in said plurality of work machines, and the work machine information so detected being transmitted to said at least one leader work machine through said first communication means;

said at least one leader work machine transmitting said transmitted work machine information to said server apparatus through said second communication means;

said server apparatus automatically producing a scheduled work plan, based on said transmitted work machine information and on said data stored in said database, and transmitting that scheduled work plan so produced to said at least one leader work machine through said second communication means; and

only said at least one leader work machine transmitting said work instructions to other work machines of said plurality of work machines through said first communication means, based on said transmitted scheduled work plan.

39. (Previously presented) The work machine management system according to claim 38, wherein said at least one leader work machine includes a display device, and wherein said scheduled work plan transmitted from said server apparatus to said at least one leader work machine is displayed on the display device.

40. (Previously presented) The work machine management system according to claim 38, wherein said scheduled work plan comprises a plurality of work processes; and said at least one leader work machine is determined for each of those work processes.

41. (Previously presented) The work machine management system according to claim 38, wherein said server apparatus transmits information relating to maintenance that should be done to any of said plurality of work machines, and said server apparatus transmits a revised scheduled work plan produced by revising the scheduled work plan in conjunction with the performance of maintenance, to said at least one leader work machine.

42. (Previously presented) The work machine management system according to claim 38, further comprising:

a terminal apparatus provided on an end where maintenance is done on said plurality of work machines, said terminal apparatus being connected to said second communication means; wherein said server apparatus transmits information relating to maintenance that should be done to any of said plurality of work machines, and transmits a revised scheduled work plan produced by revising the scheduled work plan in conjunction with the performance of maintenance, to said at least one leader work machine;

wherein said at least one leader work machine transmits instructions for performing maintenance, based on the transmitted information relating to maintenance, to said terminal apparatus through said second communication means, and transmits work instructions to other

work machines of said plurality of work machines through said first communication means based on said revised scheduled work plan.

43. (Previously presented) The work machine management system according to claim 38, wherein said server apparatus transmits information relating to trouble that has arisen in said plurality of work machines, and a revised scheduled work plan produced by revising the scheduled work plan responsive to the trouble, to said at least one leader work machine.

44. (Previously presented) The work machine management system according to claim 38, further comprising

a trouble correction terminal apparatus provided on the end where trouble with said plurality of work machines is corrected, the trouble correction terminal being connected to said second communication means;

wherein said server apparatus transmits information relating to the trouble and a revised scheduled work plan produced by revising the scheduled work plan responsive to the trouble to said at least one leader work machine; and

wherein said at least one leader work machine transmits instructions for correcting the trouble, based on information relating to the trouble, to said trouble correction terminal apparatus through said second communication means, and transmits work instructions to other work machines of said plurality of work machines through said first communication means in accordance with said revised scheduled work plan.

45. (Previously presented) The work machine management system according to claim 38, wherein said server apparatus stores in memory a schedule and performance results data indicating a relationship between a scheduled work plan previously produced and an actual work performance result as performed in accordance with said scheduled work plan, and said server apparatus produces a new scheduled work plan responsive to said schedule and said performance results data.

46. (Currently amended) A scheduled work plan production apparatus that, in cases where a scheduled work plan is produced according to work request data indicating particulars of work requested by an ordering party, and work is caused to be done, using a plurality of work machines, based on said produced scheduled work plan, produces said scheduled work plan, comprising:

a plurality of work machines, said plurality of work machines respectively including its first communication means facilitating reciprocal communications directly between said plurality of work machines;

a server apparatus;

a database for storing schedule and performance results data indicating a relationship between a scheduled work plan previously produced and an actual work performance result as performed on basis of a scheduled work plan, the data base being provided at said server apparatus;

wherein a terminal apparatus on an end of an ordering party; said server apparatus, and only at least one leader work machine of said plurality of work machines, which are connected

by a second communication means facilitating reciprocal communications only among said terminal apparatus of said ordering machine, said server apparatus, and at least one leader work machine of said plurality of work machines;

wherein said work request data are input from said terminal apparatus on said ordering party end through said second communication means;

wherein said server apparatus automatically produces a scheduled work plan based on input work request data and on a schedule and performance results data stored in said database, and said server apparatus transmits said scheduled work plan to said at least one leader work machine only through said second communication means, and updates said schedule and performance results data in said database;

said at least one leader work machine giving work instructions to said plurality of work machines through said first communication means based on said scheduled work plan transmitted from said server apparatus, and said plurality of work machines transmitting actual work performance result as performed on a basis of said scheduled work plan to said server apparatus through said second communication means; and

wherein said server apparatus updates said database with said actual work performance result.

47. (Previously presented) The scheduled work plan production apparatus according to claim 46, wherein

when revision data for revising scheduled work plan are provided, said server apparatus revises the scheduled work plan based on those revision data, said work request data, and said

schedule and said performance results data to produce a revised scheduled work plan, and said server apparatus transmits said revised scheduled work plan to said at least one leader machine of said plurality of work machines through said second communication means; and

 said plurality of work machines performing work based on the revised scheduled work plan, and said plurality of work machines transmitting the actual work performance results on a basis of said scheduled work plan to said at least one leader machine by said first communication means.

48. (Currently amended) A scheduled work plan production apparatus that, in cases where a scheduled work plan is produced according to work request data indicating particulars of work requested by an ordering party, a plurality of work machines is obtained, and work is caused to be done using said plurality of work machines so obtained, based on said produced scheduled work plan, produces said scheduled work plan, comprising:

 a server apparatus;

 a database for storing a schedule and performance results data indicating a relationship between a scheduled work plan previously produced and actual work performance results as performed on basis of said scheduled work plan, at the server apparatus;

 a plurality of work machines, said plurality of the work machines respectively including a first communication means facilitating reciprocal communications directly between said plurality of work machines;

a rental/production end terminal apparatus for renting or producing said plurality of work machines, said rental/production end terminal apparatus being provided on the ends where rental/production is performed;

a terminal apparatus on said ordering party end,

wherein said terminal apparatus, said server apparatus, only at least one leader work machine of said plurality of work machines, and said rental/production end terminal apparatus, which are connected by a second communication means facilitating reciprocal communications only among said terminal apparatus, said server apparatus, said at least one leader work machine of said plurality of work machines, and said rental/production and terminal apparatus;

wherein said work request data are input from said terminal apparatus to said server apparatus through said second communication means;

wherein said server apparatus automatically facilitates producing a scheduled work plan responsive to the work request data and to the schedule and the performance results data, transmitting said scheduled work plan to said at least one leader work machine and to said rental/production end terminal apparatus through said second communication means, and updating the schedule and the performance results data in said database;

said at least one leader work machine giving work instructions to said plurality of work machines through said first communication means based on the scheduled work plan from said server apparatus, and transmitting actual work performance results as performed on basis of said scheduled work plan to said server apparatus by said second communication means;

wherein said server apparatus updates said database with the actual work performance results; and

wherein said rental/production end terminal apparatus plans rental or production based on said scheduled work plan from said server apparatus.

49. (Previously presented) The work machine management system according to claim 33, further comprising

an information display for displaying information outside of a work site where said plurality of work machines are operating is provided in one or more of said plurality of work machines;

wherein said server apparatus produces information relating to said work site, based on the work machine information and on the data stored in said database, and transmits said information relating to said work site to said leader work machine through said second communication means; and

said at least one leader work machine displays said information relating to said work site on said information display.

50. (Previously presented) The work machine management system according to claim 49, wherein:

said information display is deployed on a work machine other than said at lease one leader work machine; and

said at least one leader work machine transmits transmitted information relating to said work site to another work machine through said first communication means and causes said information to be displayed on said information display deployed on said other work machine.

51. (Previously presented) The work machine management system according to claim 33, further comprising:

an information display for displaying information outside of a work site where said plurality of work machines are operating, installed in the periphery of said work site; wherein said server apparatus produces information relating to said work site, based on said work machine information and on the data stored in said database, and transmits said information relating to said work site to said at least one leader work machine through said second communication means; and

wherein said at least one leader work machine displays said information relating to said work site on said information display.

52. (Previously presented) The work machine management system according to claim 51, wherein said at least one leader work machine causes the information relating to said work site to be displayed on said information display installed in the periphery of said work site via said first communication means.

53. (Previously presented) The work machine management system according to claim 33, further comprising

an information display for displaying information outside of a work site where said plurality of work machines are operating, installed in the periphery of said work site; and

wherein said server apparatus produces information relating to said work site, based on work machine information that has been transmitted and on said data stored in said database, transmits said information relating to said work site to said information display through said second communication means, and causes said information relating to said work site to be displayed on said information display.

54. (Previously presented) A work machine management system of work machines according to claim 33, further comprising:

environmental condition measurement means for measuring environmental conditions in a periphery of a work site, provided in a periphery of said work site, where the environmental conditions include noise levels and toxic chemical concentrations;

at least one information display for displaying information outside of a work site, being arranged in at least one of the periphery of said work site and said at least one leader machine;

said second communication means connecting said environmental condition measurement means with said server apparatus and connecting said server apparatus with said at least one information display; and

display information production means, provided at a server apparatus producing environmental condition display information based on measured environmental condition values and on data stored in a database; wherein;

said measured environmental condition values are measured by said environmental condition measurement means, in conjunction with work progress of said plurality of work

machines, and are transmitted from said environmental condition measurement means to said server apparatus through said second communication means; and

said server apparatus produces environmental condition display information, based on measured environmental condition values and on data stored in said database, said server apparatus transmits said environmental condition display information to said information display through said second communication means, and said server apparatus causes said environmental condition display information to be displayed on said information display.

55. (Previously presented) The work machine management system according to claim 33, wherein:

data on performance results for work performed by said plurality of work machines are stored in said database in said server apparatus for each of said plurality of work machines, and when data requesting production of a work report relating to a specific work machine are transmitted from said at least one leader work machine to said server apparatus through said second communication means, said server apparatus reads out work performance results data corresponding to said specific work machine from data recorded in said database, said server apparatus produces a work report indicating particulars of work performed in a certain time period by said specific work machine, and said server apparatus transmits said work report so produced to said at least one leader work machine by said second communication means, and said at least one leader work machine manages said plurality of work machines based on said work report.

56. (Previously presented) work machine management system according to claim 55,

wherein;

a terminal apparatus for labor management is provided on the end where labor management is performed for persons on board said plurality of construction machines, and

wherein said at least one leader work machine is connected by said second communication means facilitating reciprocal communications therebetween;

wherein said at least one leader work machine transmits said work report to said terminal apparatus for labor management by said communication means; and

wherein said terminal apparatus for labor management performs labor management for those on board said plurality of construction machines based on said work report so transmitted.

57. (Previously presented) The work machine management system according to claim 33,

wherein:

said work machine information is work condition information indicating actual work conditions of a work machine;

data on schedule of work to be performed by said plurality of work machines are stored in a database in said server apparatus, for each of said plurality of work machines;

wherein, when said work condition information is transmitted from said at least one leader work machine to said server apparatus through said second communication means, said server apparatus reads out said work schedule data from data stored in said database, compares said work schedule data and said work condition information, and, when there is a discrepancy, produces anomaly information indicating that an anomaly has occurred in corresponding work

machine, and transmits said anomaly information to said at least one leader work machine through said second communication means; and

wherein said at least one leader work machine manages said plurality of work machines based on said transmitted anomaly information.

58. (Previously presented) The work machine management system according to claim 33, wherein:

said work machine information includes position information indicating an actual position of a work machine;

operating position data reflecting operating positions at which said plurality of work machines operate are stored in the database;

wherein, when said position information is transmitted from said at least one leader work machine to said server apparatus through said second communication means,

wherein, when said positional information is transmitted from said at least one leader work machine to said server apparatus through said second communication means, said server apparatus reads out said operating position data from said data stored in said database, compares said operating position data and said position information, and, when the position information deviates from the operating position data, produces anomaly information indicating that an anomaly has occurred in corresponding work machine, and transmits said anomaly information so produced to said at least one leader work machine by said second communication means; and

wherein said at least one leader work machine manages said plurality of work machines based on said transmitted anomaly information.

59. (Previously presented) The work machine management system according to claim 33,

wherein

said work machine information includes attitude information indicating an actual attitude of a work machine;

attitude limit values for said plurality of work machines are stored in the database in said server apparatus;

wherein when said attitude information is transmitted from said at least one leader work machine to said server apparatus through said second communication means,

said server apparatus reads out said attitude limit values from said data stored in said database, compares said attitude limit values and said attitude information, and, when the attitude information exceeds the attitude limit values, produces anomaly information indicating that an anomaly has occurred in corresponding work machine, and transmits said anomaly information to said at least one leader work machine through said second communication means; and

wherein said at least one leader work machine manages said plurality of work machines based on said transmitted anomaly information.

60. (Previously presented) The work machine management system according to claim 57,

wherein

an anomaly handling terminal apparatus is provided on the end where anomaly handling is performed for a construction machine wherein an anomaly has occurred, and

said anomaly handling terminal apparatus and said server apparatus are connected by a third communication means facilitating reciprocal communications therebetween;

wherein said server apparatus, when anomaly information has been produced, transmits said anomaly information to said anomaly handling terminal apparatus through said third communication means; and

wherein said anomaly handling terminal apparatus performs anomaly handling for said construction machine at which said anomaly occurred, based on said anomaly information.

61. (Previously presented) The work machine management system according to claim 57, wherein:

an anomaly handling terminal apparatus is provided on the end where anomaly handling is performed for a construction machine at which an anomaly has occurred, and wherein said anomaly handling terminal apparatus and said at least one leader work machine are connected by a third communication means facilitating reciprocal communications therebetween;

wherein said at least one leader work machine transmits said anomaly information to said anomaly handling terminal apparatus through said third communication means; and

wherein said anomaly handling terminal apparatus performs anomaly handling for said construction machine at which said anomaly occurred, based on said anomaly information.

62. (Currently amended) A management system for work machines that perform prescribed work by operation of a plurality of work machines, comprising:

a plurality of work machines; said plurality of work machines respectively including a first communication means facilitating reciprocal communications directly between said plurality of work machine;

a server apparatus, wherein only at least one main working machine of said plurality of work machines is connected to the server apparatus by a second communication means facilitating reciprocal communications only between said server apparatus and said at least one leader work machine;

work machine information detection means for detecting work machine information provided in each of said plurality of work machines;

a database storing data for managing said plurality of work machines, and management information production means producing management information based on said work machine information and on said data stored in said database, provided at said server apparatus;

in conjunction with work progress of said plurality of work machines, said work machine information is detected by said work machine information detection means, and said work machine information so detected is transmitted to said at least one leader work machine through said first communication means;

said at least one leader work machine transmits said transmitted work machine information to said server apparatus through said second communication means; said server apparatus automatically produces said management information based on said transmitted work machine information and on said data stored in said database, and transmits said management information to said at least one leader work machine through said second communication means;

said at least one leader work machine transmits work instructions to other work machines of said plurality of work machines through said first communication means, based on said transmitted management information; and

judgment means, provided in said at least one leader work machine, for judging whether communications are possible or impossible by said second communication means between said at least one leader work machine and said server apparatus;

wherein, when it is judged by said judgment means that communications by said second communication means are impossible, first latest management information received by said at least one leader work machine via said second communication means and second latest work machine information received by said at least one leader work machine via said first communication means are stored in said memory by said at least one leader work machine until it is judged by said judgment means that communications by said second communication means have become possible.

63. (Previously presented) A work machine management system for work machines that perform prescribed work by operation of a plurality of work machines, comprising:

a processor;
a plurality of work machines, said plurality of work machines respectively including a first communication means facilitating reciprocal communications directly between said plurality of work machines;

only at least one leader work machine of said plurality of work machines being connected to said processor by a second communication means facilitating reciprocal communications only

between said processor and said at least one leader work machine of said plurality of work machines;

work machine information detection means for detecting work machine information, provided in each of said plurality of work machines;

a database storing managing data, for managing said plurality of work machines, and management information production software producing management information based on said managing data and said work machine information, operably connected to said processor;

said processor, when said at least one leader work machine is determined, transmitting said managing data stored in said database and said management information production software to said at least one leader work machine through said second communication means;

wherein, in conjunction with work progress of said plurality of work machines, said work machine information is detected by said work machine information detection means provided in said plurality of work machines, and said work machine information is transmitted to said at least one leader work machine through said first communication means;

wherein said at least one leader work machine produces said management information, based on work machine information transmitted from said plurality of work machines through said first communication means, and on managing data and management information production software transmitted from said management system through said second communication means, said at least one leader work machine manages said plurality of work machines by transmitting said management information to other work machines of said plurality of work machines in accordance with said first communication means, based on said management information, said at least one leader work machine updates said managing data, and said at least one leader work

machine transmits said managing data so updated to said management system, by said second communication means, every time a certain time period elapses; and said processor updates content stored in said database using said managing data.

64. (Previously presented) A work machine management system for work machines that perform prescribed work by operation of a plurality of work machines, comprising:

a processor;
a plurality of work machines, said plurality of work machines respectively including a first communication means facilitating reciprocal communications directly between said plurality of work machines;

only at least one leader work machine of said plurality of work machines being connected to the processor by a second communication means facilitating reciprocal communications only between said processor at said at least one leader work machine;

work machine information detection means for detecting work machine information, provided in each of said plurality of work machines;

a database storing managing data for managing said plurality of work machines, and management information production software producing management information based on said managing data and said work machine information, provided at said processor;

wherein when said at least one leader work machine is determined, said managing data stored in said database and said management information production software are written to said at least one leader work machine;

wherein, in conjunction with work progress of said plurality of work machines, said work machine information is detected by said work machine information detection means provided in said plurality of work machines, and said work machine information so detected is transmitted to said at least one leader work machine through said first communication means;

wherein said at least one leader work machine produces said management information, based on work machine information transmitted from said plurality of work machines to said at least one leader work machine in accordance with said first communication means, and on said managing data and management information production software, said at least one leader work machine manages said plurality of work machines by transmitting said management information to other work machines of said plurality of work machines in accordance with said first communication means, based on said management information so produced, and said at least one leader work machine updates said managing data; and

content stored in database in said processor is updated by the at least one leader work machine writing said updated managing data in accordance with said second communication means to said processor.

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